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Original Research Article

A Study of Lipid Profile in HIV/Aids-Positive Patients

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Abstract:

Background: Human immunodeficiency virus (HIV), the third most widespread epidemic in the world, is a huge burden to the lower-middle-income country (LMIC), India. Although the number is lesser than other LMICs, India's population, estimated at 1.3 billion, manifests to 2.1 million people living with the disease. In recent years, clinicians observed elevated cholesterol and often markedly elevated triglyceride levels in HIV-infected persons maintained on HAART. Our study aims to measure the development of dyslipidemia and lipodystrophy and recommend solutions from the evidence available so far.

Materials and Methods: A prospective study was carried out in the Microbiology and Biochemistry lab, Jhalawar Medical College, Jhalawar between January 2023 to April 2023 for lipid profile i.e., serum LDL, HDL, TG and TC, in HIV-positive patients. The present study is designed to measure the levels of lipid profiles in HIV-positive patients from the data available in the Biochemistry Lab. All the data was collected through pre-designed Performa and data was entered in MS Excel software. Data was analyzed by SPSS 23.0 Software.

Result: A total of 100 HIV Positive cases were taken in the study, out of these 100 patients, 56 (56%) were male and 44 (44%) were female. The mean age of the patients was 35 ± 10.6 years. The Mean cholesterol of HIV Patients was 247.36 ± 39.25, mean Triglycerides was 203.57 ± 42.39. the mean LDL and HDL were 196.37 ± 37.6 and 65.39 ± 26.7 respectively in HIV patients.

Conclusion: In summary, atherogenic lipids including TG, VLDL-C, and LDL-C have been shown to rise in HIV-positive individuals. As the illness worsens, healthy cholesterol (HDL-C) levels drastically decline.

Keywords: HIV, Lipid profile.

Introduction

Human immunodeficiency virus (HIV), the third most widespread epidemic in the world, is a huge burden to the lower-middle-income country (LMIC), India. HIV prevalence among adults between the ages of 15 and 49 years was estimated to be 0.2% in 2017. Although the number is lesser than other LMICs, India's population, estimated at 1.3 billion, manifests to 2.1 million people living with the disease [1].

Several issues, including the stigma associated with HIV, relatively low awareness of the status of people with HIV and a broken link between diagnosis and treatment, indicate that progress is slower than expected. The lack of information on key populations and certain key indicators, such as virus suppression rates, also makes it tedious to design health programs for HIV patients to cater to the needs of those in the HIV epidemic of the country [2].

While no benchmark for incidence rate has been recommended to be achieved by 2030 for ending the AIDS epidemic, the Joint United Nations Programme on HIV/AIDS (UNAIDS) has called to achieve a 90% decline in annual new HIV infections and AIDS-related deaths by 2030 from the baseline value of 2010 [3-5].

Untreated HIV infection usually progresses to AIDS. With the introduction of HAART in the mid to late 1990s, HIV-associated morbidity and mortality in treated patients have significantly reduced so that they no longer succumb to opportunistic infections [6]. This is true, especially in developed countries. The efforts of international donors and organisations have assisted in providing easy access to HAART in most developing countries like Nigeria. However, patients with HIV are subject to dyslipidaemia and other complications secondary to HAART which are often referred to as HIV

metabolic syndrome [7]. Lipid abnormalities are prevalent among persons living with HIV infection and are important for several reasons. From a clinical perspective, HIV increases the risk of cardiovascular (CV) events to the same extent as traditional risk factors such as diabetes or hypertension [8, 9].

Dyslipidaemia associated with combination ART use is characterised by increased levels of serum total cholesterol (TC), low-density lipoprotein cholesterol (LDL-c) and triglycerides (TG) and a decreased high-density lipoprotein-cholesterol (HDL-c) level [10-12].

In recent years, clinicians observed elevated cholesterol and often markedly elevated triglyceride levels in HIV-infected persons maintained on HAART. The dyslipidaemia was often associated with other metabolic abnormalities, including insulin resistance and lipodystrophy, characterized by accumulation of visceral fat, an enlarged dorsocervical fat pad, and atrophy of subcutaneous fat in the face, buttocks and extremities. This constellation of findings has been termed the HIV-related lipodystrophy syndrome. In many ways, it resembles the rare congenital and autoimmune disease-related lipodystrophy syndromes [13].

Discontinuation of antiretroviral therapy in the SMART study resulted in a decline in total cholesterol and LDL-cholesterol, but HDL-cholesterol declined as well, leading to an unfavourable increase in the total/HDL-cholesterol ratio [14]. Our study aims to measure the development of dyslipidemia and lipodystrophy, discuss the current challenges in treating dyslipidemia with HIV-infected patients and recommend solutions from the evidence available so far.

Aims & Objectives:

To Study the lipid profile in HIV Positive Patients.

Material and Methods:

Source of Data:

A prospective study was carried out in the Microbiology and Biochemistry lab, Jhalawar Medical College, Jhalawar between January 2023 to April 2023 for lipid profile i.e., serum LDL, HDL, TG and TC, in HIV-positive patients. In this present study, data from 100 HIV-positive cases was audited regarding the lipid profile.

Study Design:

The present study is designed to measure the levels of lipid profiles in HIV-positive patients from the data available in the Biochemistry Lab.

Normal Range

:(According to S.R.G. Hospital, Clinical Biochemistry Laboratory)

1. Total Cholesterol – 150-240 mg/dl
2. Triglyceride – 50-200 mg/dl (M), 40-150 mg/ dl (F)
3. Direct LDL – 80-175 mg/dl
4. HDL – 30-60 mg/dl (M), 35-75 mg/dl (F)

Ethical Justification:

This study is not interventional, invasive, or harmful to study subjects. Ethical clearance was obtained from S.R.G. Hospital and Medical College, Jhalawar Ethical Committee.

Statistical Analysis:

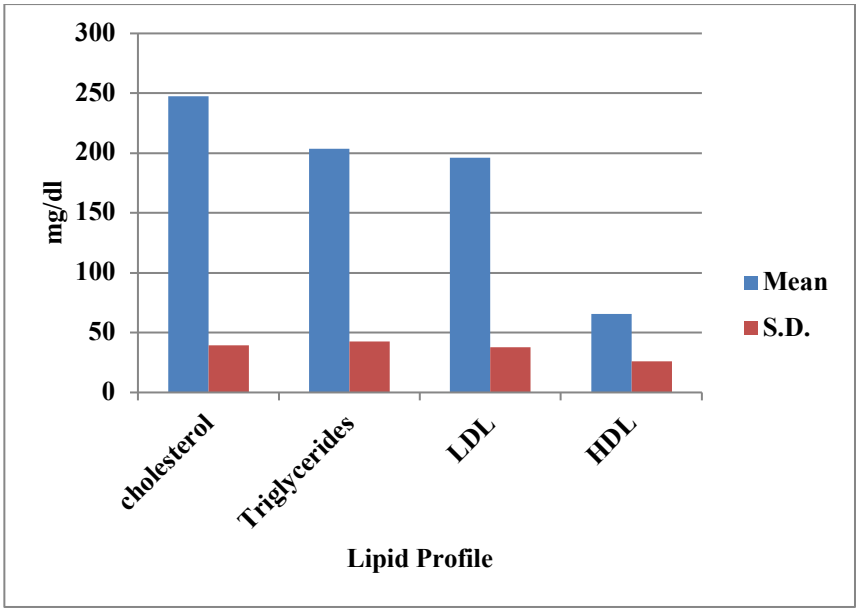
All the data was collected through pre-designed Performa and data was entered in MS Excel software. Data was analyzed by SPSS 23.0 Software.

Result:

A total of 100 HIV Positive cases was taken in the study, out of these 100 patients 56 (56%) were male and 44 (44%) were female. The mean age of the patients was 35 ± 10.6 years. Most of these 100 patients (78%) belong to Hindu religion. The mean lipid profile of HIV-positive patients like serum LDL, HDL, TG and TC was given in **Table 1 and Graph 1.**

Table: 1 Distribution of Lipid Profile in HIV Patients

	Mean	SD
Total Cholesterol	247.36	39.25
Triglycerides	203.57	42.39
LDL	196.37	37.6
HDL	65.39	26.27

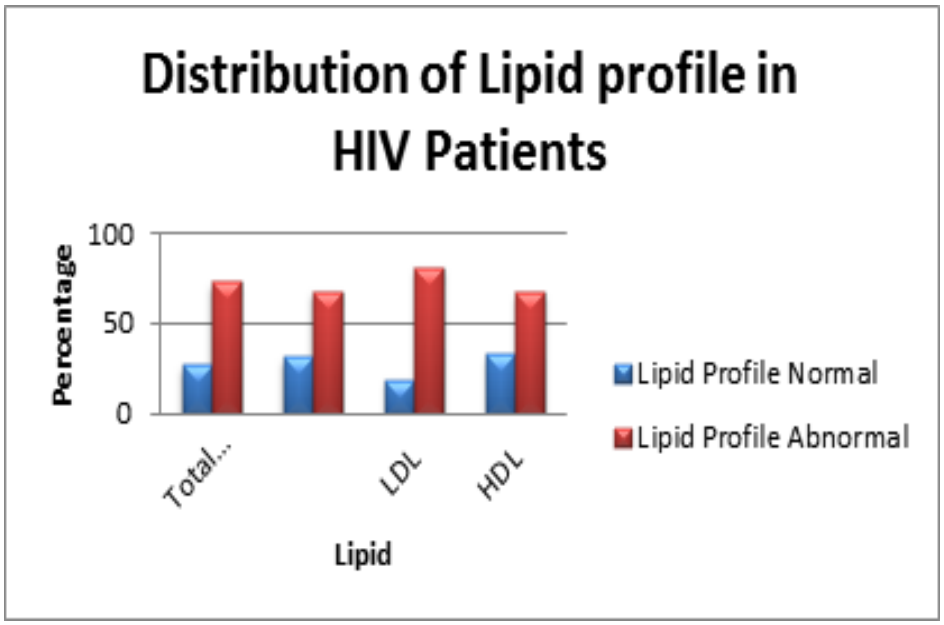


Graph 1: Distribution of Lipid Profile in HIV Patients

The Mean cholesterol of HIV Patients was 247.36 ± 39.25, mean Triglycerides was 203.57 ± 42.39. the mean LDL and HDL were 196.37 ± 37.6 and 65.39 ± 26.7 respectively in HIV patients. There was normal cholesterol was found in 27 (27%) of HIV patients and Normal TG was found in 32% of patients. The LDL level was abnormal in 81% of patients and HDL was abnormal in 67% of Patients (Table 2 and Graph 2)

Table 2: Distribution of Lipid Profile in HIV Patients

	Lipid Profile	
	Normal	Abnormal
Total Cholesterol	27 (27%)	73(73%)
Triglycerides	32(32%)	68(68%)
LDL	19(19%)	81(81%)
HDL	33(33%)	67(67%)



Graph 2: Distribution of Lipid Profile in HIV Patients

Discussion:

Insulin resistance, lipodystrophy, and dyslipidemia are among the several metabolic problems that the majority of HIV-positive individuals have. Insulin is known to block hormone-sensitive lipase, which prevents lipolysis in adipose tissue. Therefore, increased lipolysis in adipose tissue as a result of insulin resistance associated with HIV infection will raise plasma levels of free fatty acids, triglycerides, and cholesterol [15]. It has been demonstrated that HIV infection affects several crucial mechanisms controlling lipid levels. Insulin resistance and lipolysis are increased by increased tumour necrosis factor (TNF) and other cytokines produced during infection. Reduced insulin sensitivity in HIV-positive individuals with decreased CD4 counts results in decreased glucose absorption into skeletal muscle tissue and other cells, which raises the level of free fatty acids in the blood and decreases the amount of triglycerides stored in adipose tissues. After returning to the liver, these free fatty acids are converted back into triglycerides and released into the bloodstream. Thus, compared to controls, HIV-positive individuals had noticeably higher triglyceride levels. The Floris-Moore et al. [16]

High rates of hypertriglyceridemia and hypercholesterolemia are linked to increased cytokine levels in HIV/AIDS patients. Both HIV and AIDS patients have cholesterol-containing lipoprotein before hypertriglyceridemia manifests. It's likely that as AIDS progressed, a rise in interferon IFN may have decreased plasma TG clearance, which in turn may have led to an increase in plasma TG levels. According to research by Grunfeld et al., IL and INF stimulated hepatic lipogenesis, which raised plasma TG levels. [17]

In summary, atherogenic lipids including TG, VLDL-C, and LDL-C have been shown to rise in HIV-positive individuals. As the illness worsens, healthy cholesterol (HDL-C) levels drastically decline. For individuals with HIV/AIDS, lipid profiles can therefore be a useful indicator of the course of their illness. When the CD4+ count declines in HIV-positive individuals, accurate monitoring of lipid levels becomes necessary. This will assist medical professionals in selecting the appropriate antiviral medication for their patients, as specific drug combinations can lower the levels of these atherogenic lipids.

Limitation: We had to conduct a study of only 100 patients because we had a limited time duration. It was a single-centre study but results were not affected by the limitation.

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